FROM ONE TO MANY BUSINESS MODELS: UNCOVERING CHARACTERISTICS OF BUSINESS MODEL PORTFOLIOS

Research paper

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Abstract

As business model (BM) innovation has become one of management's top priorities, anecdotal evidence suggests that firms do not have one single BM but run multiple BMs in parallel. From an academic perspective, only few attempts have been made until today, to broaden the scope of research from one to many BMs within firm boundaries. To close this gap, we systematically review the emerging literature on "multiple" BMs, based on a theoretical framework that links the BM concept with general mechanisms of corporate portfolio management. Our results show that firms develop BM portfolios as a direct result of challenges in today's technology-driven environment, such as disruptive industry BMs and the need to commercialize technologies with innovative BMs. More specifically, our findings challenge the general assumption that firms should (or can) be described based on a single BM. Segmentation, configuration and coordination of multiple BMs can complement a customer-centric perspective in the BM development and management process, not only for large organizations. We provide initial characteristics of these mechanisms and outline areas for future research.

Keywords: business model, business model portfolio, business model management, business model synergies

1 Introduction

"*Trying to operate more than one business model at a time is devilishly difficult – and frequently cited as a leading cause of strategic failure*" (Casadesus-Masanell & Tarziján 2012). In particular, today's rapidly advancing technologies offer many opportunities for companies not only to develop new products but also to commercialize them as part of innovative business models (BMs). For example, cloud computing offerings are run on large infrastructures and allow users to access computing resources on demand and pay-per-use – thus challenging the traditional BM of many software companies of how to develop and deliver software products (Boillat & Legner 2013). Consider also the example of Hilti, a world-leading manufacturer of construction tools, that developed an innovative BM in parallel to an existing one by moving some of its customers from selling tools to selling tool *use* as part of a fleet management program (Johnson et al. 2008). And complementing product with service BMs helps manufacturing firms to react to diminishing sales margins and increase competitiveness through additional revenue streams (Kindström 2010). Anecdotal evidence suggests, therefore, that firms employ different

and complementing business logics under the corporate umbrella, a phenomenon which has largely been neglected by previous literature (Sohl & Vroom 2014).

During the last decade, academia has become significantly interested in the BM concept (Wirtz et al. 2015). In particular, scholars from the Information Systems (IS) discipline recognized important links between BMs and key IS topics, such as IS and strategy (Hedman & Kalling 2003), conceptual modeling (Osterwalder & Pigneur 2013), and eBusiness (Pateli & Giaglis 2004). Today, BMs are often defined as a "system-level, holistic approach to explaining how firms 'do business'" (Zott et al. 2011). However, these conceptualizations neglect the phenomenon of multiple BMs per organization as they consider one single BM as unit of analysis (Sohl & Vroom 2014). Despite ample anecdotal evidence and recent calls for research on multiple BMs, sometimes framed as BM "portfolios" (Osterwalder & Pigneur 2013; Spieth et al. 2014), little has been done to conceptualize multiple BMs systematically.

This is a problem, because it leaves researchers and practitioners with the insights from related research streams, which neglect the specific challenges and characteristics associated with multiple BMs (Markides & Charitou 2004; Casadesus-Masanell & Tarziján 2012). BMs are a key locus of innovation (Amit & Zott 2001; Chesbrough 2010). Many incumbent organizations begin to adopt BM logic (Terrenghi et al. 2017) and learn how to develop innovative BMs systematically (Bucherer 2005; Frankenberger et al. 2013). However, in contrast to start-ups, incumbent organizations have often been operating in business for several years or decades, have (un-)successfully established various products in various markets, and want to leverage existing assets in conjunction with new BMs (Kim & Min 2015). Given that IS research is a key contributor to the successful adoption of the BM concept (Veit et al. 2014), we need further insights into the specific challenges of multiple BMs.

In order to address this gap, our main research objective is to review extant BM literature and provide the most up-to-date and comprehensive review on the phenomenon of multiple BMs. Through this review, we want to clarify the general idea and the associated challenges of multiple BMs. As a first research question we ask, *why organizations develop multiple BMs* (RQ1). Specifically, we frame our research and structure the field by linking the BM concept with corporate portfolio management mechanisms. Our second research question is consequently: *what are the characteristics of multiple BMs in regards to general portfolio management mechanisms* (RQ2)? We contribute to BM theory not only by identifying all articles concerned with multiple BMs, based on a unique set of keywords, but also by showing that existing literature applies a wide set of differing definitions and conceptualizations of multiple BMs and by discussing common themes associated with portfolio management mechanisms building on the BM as the central unit of analysis. As such we discuss systematically characteristics of the construct of BM portfolios and show important areas for future research in IS.

2 Theoretical Background

2.1 Business model concept

Many managers associate the term business model intuitively with its graphical representation. In fact, the initial purpose of BM discussions revolved around representations, in order to understand how new companies do business (Gassmann et al. 2013; Morris et al. 2005; Osterwalder et al. 2005) and exploit new opportunities (Pateli & Giaglis 2003). Since then, much work has been done, defining and representing BMs, and more general in regards to understanding what a BM is and how it can be conceptualized (Baden-Fuller & Morgan 2010; Zott & Amit 2010). The topic attracted great, yet diverse, attention across many disciplines and is on top of today's research agendas (Burkhart et al. 2011; Wirtz et al. 2015). It is a key element in explaining the interrelations between strategy and IS (Hedman & Kalling 2003). The topic was (and to some extend is) still suffering from conflicting conceptualizations. Nevertheless, there appears to be an agreement about some fundamental aspects (Wirtz et al. 2015). For example, the dependency of new technologies on the right BM to achieve commercial success and as a

source of innovation itself (Massa & Tucci 2013). The increasingly unified understanding of BMs, defines it at the focal firm as boundary spanning activity system (Zott et al. 2011) that describe business logic in terms of value creation, products, customers and value capture (Wirtz et al. 2015). Outside innovation context, BMs have also become highly relevant in management research as a new unit of analysis for example to strategy (Casadesus-Masanell & Ricart 2010) and firm performance (Zott et al. 2011). In IS, classifications of BMs in IT industries, digital BMs and IT support for the development and management of BM are key topics (Veit et al. 2014).

2.2 From one to many business models

Anecdotal evidence has suggested that firms employ multiple BMs (Markides & Charitou 2004; Casadesus-Masanell & Tarziján 2012; Johnson et al. 2008; Sohl & Vroom 2014). For example Casadesus-Masanell & Tarziján (2012) highlight that *"*situations abound where a company may wish or need to address several customer segments, using a particular business model for each one. To […] expand into new markets, to make more efficient use of fixed assets […]*"*. Extant discussions on the BM concept have mostly ignored the implications of this evidence and consider one single BM as unit of analysis (Sohl & Vroom 2014). This is apparent in statements such as "one can conceptualize a *firm's* business model as a system comprised of activities that are performed by the firm and by its partners […]" (Zott & Amit 2013). For example BM innovation research is often technology centred and concerned with the development of an innovative, in a sense of one, BM in order to commercialize a specific technology (Chesbrough 2010) and ignores, for example other products and technologies in the same organization.

A limited number of articles has begun to use the notion of "portfolios" to address the phenomenon of multiple BMs: "A similar approach to the one we took in establishing a common language for the design, selection, testing, and building of business models […] could be refined and applied to other strategic notions such as […] the *business model portfolio*" (Osterwalder & Pigneur 2013). Spieth et al. (2014) mention the relationship between BM innovation and BM portfolio management and ask "how can corporate leaders create legitimacy to deviate the traditional market/technology focus of the firm toward new business models, and how can they reallocate existing corporate resources and processes without causing potentially harmful internal conflicts in the organization". The previous two articles mention the BM portfolio concept only as prospective research. Sabatier et al. (2010), in contrast, build on the analogy of BMs as recipes and conceptualize BM portfolios as the "dinner". Sohl & Vroom (2014) develop the construct of BM relatedness to understand "which business models could be combined into a portfolio to create value". However, this literature considers the portfolio concept in different contexts (e.g. innovation or management) and builds on different definitions. For example, Sabatier et al. (2010) investigate the specific set-up of portfolios of BMs in small biopharma firms, while Sohl & Vroom (2014) develop the construct of BM relatedness. In this research, we build on these ideas and argue that the phenomenon of multiple BMs should be approached from the perspective of portfolio management. Motivated by these discrepancies and the lack of a systematic review of articles on multiple BMs, we take a step back and analyze the full body of literature on multiple BMs, based on a theoretical framework that builds on three general mechanisms of corporate portfolio management, to structure the field more systematically and suggest fundamental characteristics of BM portfolios.

2.3 A portfolio perspective on multiple business models

Corporate portfolio management (referred to as portfolio management in the remainder of this paper) is usually concerned with the "multi-business" and defines a portfolio as a set of related elements (Nippa et al. 2012). Wider definitions include also dynamic decision processes such as evaluation, prioritization and resource allocation (Cooper et al. 2001). Central ideas associated with portfolios, regardless of context, are usually "parenting advantage" (assessing whether one is the best possible owner of an element) (Pidun et al. 2011), diversification in terms of portfolio extension or reconfiguration (Ansoff & Kirsch 1982), balancing risks (Donaldson et al. 2012) or leveraging synergies (Pidun et al. 2011).

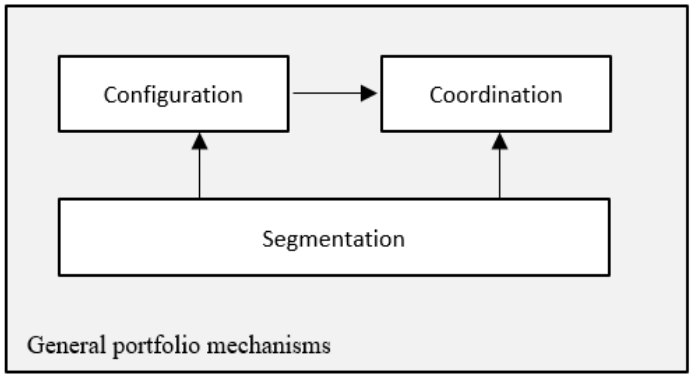

Figure 1. Theoretical framework

From literature, three mechanisms that are inherent to managing a portfolio can be derived (Müller-Stewens & Lechner 2011): The first mechanism is *segmentation* and aims at decomposing the organization into meaningful segments (Nippa et al. 2012), to reduce internal complexity. The other two mechanisms are configuration and coordination (Müller-Stewens & Lechner 2011). *Configuration* is the selection and diversification of businesses, in other words making choices about the boundaries of the portfolio (what is to be part of the portfolio) and *coordination* is the design of relationships between businesses such as synergy realization and resource transfers. These three mechanisms are interrelated and build on each other because the way an organization is segmented into different elements influences the understanding and management of configuration and coordination. Coordination depends on configuration because only those elements that have been previously selected to be part of the portfolio can be coordinated. Figure 1 represents this theoretical framework.

3 Research methodology

3.1 Research approach and process

In order to understand the current state of literature on multiple BMs we adopt a systematic literature review as overall methodology following the guidelines suggested by Webster & Watson (2002) and vom Brocke et al. (2015). Literature reviews are valuable means in order to becoming oriented in an emerging domain (Green et al. 2006) and essential to understand the breadth of the research on a topic of interest, provide a conceptual background for subsequent research, and identify topics for future research (Cooper 1988), all of which we aim to achieve.

3.2 Literature selection and keywords

Our literature review was conducted in May 2016 and covered the years 2000 until 2016. An initial literature review on Google Scholar for the term "business model portfolio" revealed that it had only explicitly been used (and not just been mentioned as prospective research) by Höök et al. (2015) and Sabatier et al. (2010). Therefore, we extended our search to publications with keywords that indicate focus on "multiple" BMs and applied an iterative search process. Each time a new article was identified, we scanned the abstract for other keywords that were used synonymously for "multiple".

The final set of keywords are as follows: *"business model" AND (multi* OR ambidex* OR divers* OR relat* OR varia* OR coexist* OR co-creat* OR parallel OR hybrid OR config* OR dual OR portfolio OR complement* OR plural* OR aqui* OR two OR three OR four OR different OR several OR various OR align* OR system* OR both OR compound OR simultaneous* OR link* OR inter*)*

To have a very complete overview of the topic, we conducted our search by means of keywords in four scientific databases: EBSCO host (Business Source Premier), ProQuest, Web of Science, and AIS Electronic Library. The overall search resulted in 2159 articles. Together with two research assistants, we manually scanned the title and the abstract of each of them, we deleted duplicates and identified 84 potentially relevant papers, published in academic outlets (except Aversa & Haefliger (2016)). We then read each article in depth and adopted inclusion criteria similar to Zott et al. (2011): first, an article must build on BMs in "nontrivial and non-marginal way" and secondly "refer to the business model as a concept related to business firms (as opposed to, e.g. economic cycles)". To be included in our review, an article must discuss either explicitly or implicitly the general idea of multiple BMs in the same company, either on a conceptual level or by considering at least two BMs as distinct entities. Finally, we conducted for each article a forward and backward search.

3.3 Analysis framework

During the review and classification process, we analyzed and coded the selected publications by focusing on the following three aspects: (1) *general publication data*, (2) *research methodology* and (3) *content analysis*. For the general publication data, we included sub-codes for the year of publication and the publication type (conference or journal). Methodology-related data has been coded bottom up. We distinguish between empirical and conceptual approaches. Relying on the literature, discussed in our theoretical background, we identified the critical coding criteria of our contents analysis. In regards to BM theory, *perspective*, *motivation*, *lifecycle phase* and *components* are the dimensions that emerged. In order to identify the attributes of each dimension, we proceeded inductively. In particular, we coded the perspective of each selected article as *static* or *dynamic* (perspective), depending on whether it focused on an analysis or result of an analysis at one point in time (static) or addressed dynamic aspects such as BM change (dynamic) and the explicit or implicit motivations of an organization to employ more than one BM (motivation). The lifecycle dimension describes four phases similar to Amit & Zott (2014) *analysis*, *design*, *implementation* and *management*; the components dimension has been coded according to *value creation*, *value delivery* (value proposition and customers) and *value capture*. As previously stated, we adopt also portfolio management theory. It follows that we include *segmentation*, *configuration* and *coordination* as key dimensions of our contents analysis.

In the first step of our content analysis, we analyzed each article and coded it based on the designed scheme. Articles without substantial contribution were excluded, resulting in the final set of reviewed and eligible articles that comprises 20 articles. To ensure inter-rater reliability, a second reviewer verified the codes. Differing views between the two coders were discussed with a third reviewer until agreement was reached.

4 Results

4.1 Literature overview

Emergence of the "multiple" BMs phenomenon. "Multiple" BMs have only been emerging as a topic in the academic community during the last six years, with one exception (first study by Markides and Charitou dating back to the year 2004). The absolute majority of articles (15) was published during the last three years. In total, 20 articles between 2004 and 2016 were identified. Outlets are quite diverse and range from strategic and general management journals – such as the Strategic Entrepreneurship Journal (2), Harvard Business Review (1), Academy of Management (3), Long Range Planning (3), Corporate Change (1), Journal of Competence-Based Strategic Management (1) – to technology management including the Journal of Technology Transfer, the Journal of Engineering Technology Management (1), R&D Management (1), and specialized journals, such as Industrial Marketing Management

(1) and Construction Management Economics (1). About two-thirds (14), provide rich empirical evidence while only one-third give weight to theoretical and conceptual contributions.

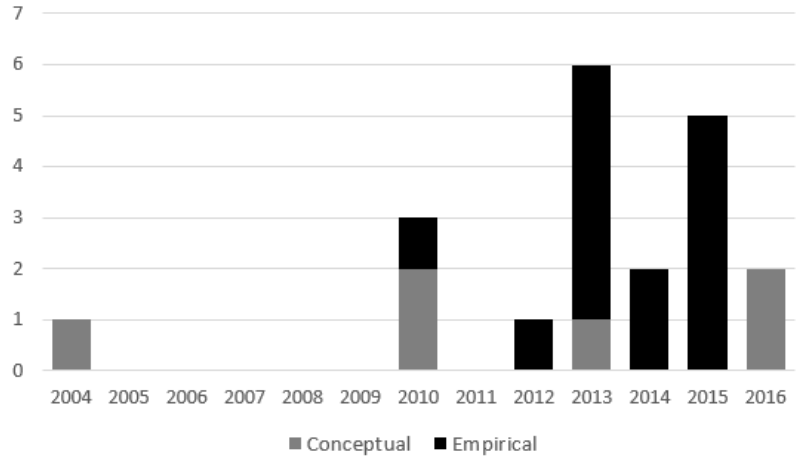

Figure 2. Number of identified publications dealing with multiple business models

Conceptualizations of "multiple" BMs. The number and range of different outlets indicates already what becomes obvious after examining each article in detail. The common ground, in terms of conceptualizations and definitions, is relatively small and a large number of terms are used to describe multiple BMs (see Table 1).

Author(s), Year	Exemplary conceptualizations
(Aversa et al. 2015)	"previous studies of business models have devoted relatively little attention to the fact that firms often run multiple business models simultaneously, thus implementing *configurations of business models*"
(Sabatier et al. 2010)	"we define a *portfolio of business models* as the range of different ways a firm delivers value to its customers to ensure both its medium term viability and future development"
(Höök et al. 2015)	"Dynamic aspects of intended company change can be related to the development and management of a *portfolio of business models* […]. A portfolio of business models is seen as a *reflection of the realized strategy* of a company"
(Winterhalter et al. 2015)	"With this study, we follow up on the call for more in-depth studies to investigate how firms can integrate or separate new business models in/from the existing business model […]."
(Moingeon & Lehmann-Ortega 2010)	"[This study] highlights […] the difficulties encountered when two business models (the old and the new) coexist during and after the strategic experimentation phase."
(Casadesus-Masanell & Tarziján 2012)	"[…] clear, however, other business models are complementary. […] A company that recognizes which models are substitutes that must be kept separate and which are complements that strengthen each other can build a uniquely sustainable competitive advantage"

Table 1. Exemplary conceptualizations of "multiple" BMs

Each group of authors develops idiosyncratic definitions of central concepts and the articles' objective. At a first glance, we did not find common definitions or conceptualizations of multiple BMs which could help to compare the results of these articles. This lack of consistent definitions is typical in BM research

and ”represents a potential source of confusion, promoting dispersion rather than convergence of perspectives, and obstructing cumulative research progress” (Zott et al. 2011). Therefore, we started to review these publications, guided by the general dimensions of our analysis framework.

4.2 Why do organizations develop multiple BMs?

In regards to BM theory, static as well as dynamic aspects are addressed (Table 2). Interestingly, analysis, implementation and management are the dominant lifecycle phases and rather than the design phase. The actual composition of one BM was not very relevant because most authors adopted similar BM components, roughly related to value creation, value delivery and value capture – or were unspecific about it. Some emphasized value creation in terms of resources and competencies (Benson-Rea et al. 2013; Sohl & Vroom 2014). In response to our first research question, the classification of the selected literature provides also valuable insights regarding the motivations that lead organizations to develop more than one BM. We could derive four specific rationales:

React to potentially disruptive technologies. The technological evolution is perceived by practitioners as both opportunity and threat (Markides 2013). Together with novel BMs, new technologies have the potential to disrupt existing industries. In order to commercialize emerging technologies, prevent market loss, and hinder new entrants, organizations need to develop new business models that are driven by the technology and may differ significantly to the traditional one (Hoßbach, 2015).

Seize new market opportunities. BMs are a means to enter new markets or generate additional profits in markets with decreased sales margins: a variety of empirical articles show that organizations develop multiple BMs to leverage existing competences and to compete in different markets, sometimes with very different strategies (e.g., differentiation and low-cost) (Markides & Charitou 2004; Smith et al. 2010; Sabatier et al. 2010). Due to the divergence in the requirements and characteristics of two or more markets, BMs need to be adapted accordingly, leading to the existence of multiple BMs (Winterhalter et al. 2015).

Commercialize product innovation. In some cases organizations must embed product innovations in novel BMs (Moingeon & Lehmann-Ortega 2010). In such cases, the additional BM differs significantly to the existing one because of the nature of the product or service offering. For example, “services might be a solution to generate additional profits in saturated markets” (Kessler & Brendel 2016).

Mitigate risk and uncertainty. A further reason for organizations to develop multiple BMs seems to be grounded in uncertain environments and the need for risk mitigation. In this regards, (Sabatier et al. 2010) highlight strategic choices of small firms in biopharmaceutical industry to diversify their revenue streams to mitigate the risks associated with risky product developments. (Andries et al. 2013) argue that early experimentation with multiple BMs is owned to the inherent uncertainty in new BMs and the development of multiple BM alternatives allows for risk diversification.

	Method		**BM theory**														**Portfolio mechanisms**												
			Perspect.		Motivation				Lifecycle phase				BM component				Segmentation				Configuration			Coordination					
	Empirical	Conceptual	Static	Dynamic	Potential disruption	New markets	Commercialize techn.	Risk mitigation	Analysis	Design	Implementation	Management	Value creation	Value delivery	Monetization	Unspecific	Conceptual types	Instances	Analytical	Hierarchical	Theoretical fit	Balancing	Experimentation	Identify syn. /confl.	Leverage syn. /confl.	Cognition	Leadership / Culture	Resource transfer	Organ structure
(Benson-Rea et al. 2013)	x		x				x		x				x				x				x							x	
(Höök et al. 2015)	x			x					x		x		x	x	x				x		x			x				x	
(Sabatier et al. 2010)	x	x	x					x	x	x			x	x	x		x				x	x							
(Aversa et al. 2015)	x		x						x				x				x				x			x				x	
(Sohl & Vroom 2014)	x		x		x				x				x				x				x			x				x	
(Clausen & Rasmussen 2013)	x		x						x							x	x				x							x	
(Casadesus-Masanell & Tarziján 2012)	x		x		x	x			x				x					x						x	x			x	
(Hoßbach 2015)	x		x		x						x		x	x	x			x						x	x			x	
(Kim & Min 2015)	x		x		x				x		x	x				x		x						x	x	x			x
(Markides 2013)		x	x			x					x	x				x		x						x	x				
(Winterhalter et al. 2015)	x		x			x					x		x	x				x						x	x				
(Kessler & Brendel 2016)		x	x		x	x	x		x				x	x	x		x				x				x			x	
(Aversa & Haefliger 2016)		x	x			x			x				x	x	x				x					x					
(Andries et al. 2013)	x			x				x		x	x					x		x	x				x					x	
(Moingeon & Lehmann-Ortega 2010)	x			x			x			x	x				x			x	x					x		x			
(Markides & Charitou 2004)		x		x		x					x	x	x	x				x			x	x		x	x				x
(Smith et al. 2010)		x		x	x						x	x				x		x								x	x		
(Velu & Stiles 2013)	x			x	x	x				x	x	x				x		x								x			
(Aspara et al. 2013)	x			x	x							x				x				x					x	x		x	
(Khanagha et al. 2014)	x			x	x				x							x				x								x	x

Table 2. Literature analysis

5 Portfolio perspective on multiple BMs

The notion of BM portfolios is only explicit in 4 articles (Höök et al. 2015; Sabatier et al. 2010; Sohl & Vroom 2014; Aversa & Haefliger 2016). All articles discuss aspects related to segmentation, configuration or coordination. In our content analysis, we therefore mapped articles to the generic portfolio mechanisms presented in section two.

5.1 Segmentation

Configuration and coordination depend to some extent on the segmentation method. Three approaches are applied to segment the BM portfolio. In the first approach, BMs are demarcated based on conceptual types. Types are derived either purely deductively (from theory) or inductively (from empirical data). The portfolio of BMs is then described based on the types of BMs found in the case setting. For example, Sohl & Vroom (2014) derived four types of BMs in the retail industry from prior literature in addition to interviews with retail managers (non-store selling, discount, traditional small-store, and traditional large-store). Then, the portfolio of retail firms was described by the number of BMs applied in each type. Aversa et al. (2015) collected mainly secondary data and conducted interviews with industry experts to come up with four kinds of BMs in the Formula 1 industry (supply, talent, internal and external knowledge transfer). Then each company was described in terms of the used BM types. Sabatier et al. (2010) propose that each BM of biopharma start-ups addresses exactly one of the main activities in the pharmaceutical value chain (e.g. drug discovery, preclinical studies, trials, knowledge orchestration and process optimization). Other types were for example "low-cost" and "premium" (Winterhalter et al. 2015) or "traditional" and "online" (Hoßbach 2015). (Kessler & Brendel 2016) discuss relationships between "planned obsolescence" and "product-service systems" BMs.

The second approach is different to the first one and applies an analytical process. This approach is based on the systematic analysis and comparison of BM components, and not on idealistic types. For example, Moingeon & Lehmann-Ortega (2010) studied the case of a French security transportation firm that has developed a new cash transportation system. They compare the "value proposition", "value architecture" and "profit equation" components and conclude that the new system is embedded into a new BM because it differs in all three components from the existing BM. They qualify a new BM as being different in all components. Höök et al. (2015) relax this assumption and demarcate BMs if they differ in at least one component. Similarly, Andries et al. (2013) "regard any observed combination of these sub-items [offering, market, internal capabilities, competitive strategy, economic factors, personal factors] as one specific business model".

The third approach takes a structural or hierarchical lens and is only used by Aspara et al. (2013) in their case study of Nokia's BM transformation. They segment the BM portfolio according to the organizational structure in terms of the corporate BM, and one BM per business unit. Overall, the approaches that build on theoretical types or a set of specific BM instances dominate.

5.2 Configuration

5.2.1 Theoretical fit to guide diversification

If the corporate business logic is decomposed into a set of related BMs, the natural question for organizations is where to draw the boundaries or, in other words, which BMs to select to be part of their BM portfolio. Several authors investigate, which BMs should be combined to guide BM portfolio diversification. Aversa et al. (2015), for example, identify the "configurations" of BMs in the Formula 1 racing industry, which are associated with different levels of performance. They find that "two business models – one focused on selling technology to competitors, the other one on developing and trading human resources with competitors – are associated with high performance". Sohl & Vroom (2014) build a robust theoretical argument and show empirically that the concept of BM "relatedness" is a dominant predictor of firm performance in the retailing industry. The underlying assumption is to use theoretical types to identify related BMs. Two BMs are related if they belong to the same "type" and diversification

into related BMs drives performance because strategic resources are more similar within than across related types (Sohl & Vroom 2014). Clausen & Rasmussen (2013) show that the combination of some BMs are linked to higher performance and that "pursuing several business models at the same time may be particularly important for the commercialization of academic research". In summary, combining the right BMs depends on attributes associated with theoretical types.

5.2.2 Balancing risks, returns and interdependencies

BMs are associated with different levels of risks, expected returns and dependency on external partners (Sabatier et al. 2010). For Sabatier et al. (2010), a "portfolio of business models" is a strategy adopted by small biotech firms to balance the level of promise associated with each BM (defined as "the time lag between investments and revenues, the level of risk and the level of expected returns"). But also the dependency on other actors such as suppliers and producers can be balanced by adopting different BMs. Benson-Rea et al. (2013), for instance, consider the level of "internalization" and "externalization" (defined in terms of ownership and control over the resources in one BM) as the determining factor of the different BMs adopted by firms in the winery industry. Common to this aspect is that each BM in the portfolio is analysed and balanced with regard to main strategic attributes, such as risks, returns and interdependencies.

5.2.3 Choosing the right portfolio diversification strategy

The number of BMs pursued moderates short- and long-term success. Thus, not only complementarity of types and achieving balance are important to BM configuration, but also the total number of BMs run in parallel. Focusing on one BM affects firm growth and success in early phases due to focused commitment but may "jeopardize long-term survival" (Andries et al. 2013). A smaller number of BMs implies stronger focus and is important to convincing investors but may hamper long-term survival due to a lack of resource variety. The reason is that by pursuing several BMs in parallel the firm develops additional capabilities and resources, which can be re-used in another or new BM if one BM turns out to be unsuccessful (Andries et al. 2013). This fact emphasizes dynamic and strategic aspects of BM portfolio configuration. In simple words, the best way to commercialize an innovative technology is not necessarily to find the "right" BM at the outset, but to experiment with several BMs in parallel.

5.3 Coordination

5.3.1 Examining (potential) integration and separation mechanisms

Business model elements are an important unit of analysis to examine (potential) synergies and conflicts between BMs. Firms that manage to coordinate BMs by deciding about integration and separation can leverage synergies and avoid conflicts - and in extreme cases even "turn otherwise unviable possibilities into profitable opportunities" (Casadesus-Masanell & Tarziján 2012). In contrast to the dominant solution of keeping two different BMs completely separate in distinct physical organizations, companies can leverage similarities or complementarities of resources by integrating some parts of the BMs and separating others (Markides 2013; Winterhalter et al. 2015). The BM is particularly useful as a unit of analysis and to decide about integration and separation for each element separately. For example, Hoßbach (2015) conducted a case study in a large German media company that runs a traditional print BM with a circulation of about 110,000 copies per month in parallel to an online BM. She found that the company adopts integration and separation mechanisms for each BM element separately. The website, as part of the online BM, is leveraged as a channel to promote the print magazine. At the same time, other elements of the BMs, for example editorial skills (key resources), were kept separate. Relying on the BM as the unit of analysis is a novel perspective to describe and understand how firms become ambidextrous "beyond spatial separation" (Hoßbach, 2015). The main challenge for organizations, coordinating multiple BMs, is to understand which elements can be combined and complement each other and which must be kept separate (Casadesus-Masanell & Tarziján 2012; Kim & Min 2015). These decisions are contingent

to various organizational context factors, such as strategy, culture, values, leadership (Hoßbach 2015; Markides 2013) or the similarity of the target customer segment (Winterhalter et al. 2015).

5.3.2 Managing dynamic BM coordination

Dynamic environments, inherent uncertainties associated with new BMs and learnings occurring during the development of BMs make coordination a dynamic rather than static process (Smith et al. 2010). Firms may iterate between different phases of separation and integration rather than considering fixed "structural" separation (Markides & Charitou 2004; Khanagha et al. 2014). Therefore, the right decision whether or not BMs are complements and should be integrated, is temporary and undermines "deterministic decision making on the nature of engagement with the new business model" (Khanagha et al. 2014). During BM design, potential cannibalization effects must be detected and management convinced to buy-in a new BM (Moingeon & Lehmann-Ortega 2010; Velu & Stiles 2013). During implementation, the traditional BM may experience significant incisions, if customers switch to the new BM or two infrastructures need to be run in parallel (Moingeon & Lehmann-Ortega 2010). Managing these complex dependencies "depends on leadership that can make dynamic decisions, build commitment to both overarching visions and agenda specific goals, learn actively at multiple levels, and engage conflict." (Smith et al. 2010). But also cognition and the understanding of BMs that need to be coordinated are mentioned (Moingeon & Lehmann-Ortega 2010; Velu & Stiles 2013). Thus, the success of a BM may not only depend on its initial design but also on ongoing integration and separation within the organization.

6 Discussion

Anecdotal evidence suggests that firms run multiple BMs in parallel (Markides & Charitou 2004; Casadesus-Masanell & Tarziján 2012; Sohl & Vroom 2014). Previous literature has begun to report on multiple BMs, but not yet systematically. Based on a structured literature review resulting in a set of 20 articles and a framework that applies three general mechanisms of corporate portfolio theory, we synthesized literature and presented key characteristics of BM portfolios. We have found four motivations of organizations for the development of BM portfolios: as a reaction to potentially disruptive technologies, to seize new market opportunities, to commercialize product innovation and to mitigate risk.

Our review has shown that authors adopt idiosyncratic approaches to BM portfolios but they provide also strong empirical evidence that supports the assumption that firms employ multiple BMs (Clausen & Rasmussen 2013; Höök et al. 2015; Aversa et al. 2015). As a main result, the general premise that firms should (or can) be described based on a single BM is challenged. A high proportion of empirical studies, compared to conceptual ones, indicate that BM portfolios are useful means to understand and analyze value creation logic of firms, which have "generally been hidden by [their] most emblematic model" (Sabatier et al. 2010). BM portfolios can "better explain the complexity of value drivers and strategies" (Benson-Rea et al. 2013). The BM concept can be, in particular, better suited than industry (Sohl & Vroom 2014) or business units (Hoßbach 2015; Markides 2013; Winterhalter et al. 2015) to describe a business. The BM portfolio lens is not only useful for researchers (Sohl & Vroom 2014) but provides also "a tool for managing change in a company" as it helps managers to discover unintended BMs and implement strategy by implementing a portfolio of BMs (Höök et al. 2015; Sabatier et al. 2010). As Höök et al. (2015) note: "in our case, when management finally took the notion of business models in a portfolio context to their hearts, positive change occurred". This underlines recent arguments for systematic BM management processes (Amit & Zott 2014; Eisert & Doll 2015).

Future research in IS should leverage its past experiences in the BM domain and address also the specific challenges of BM portfolios (Figure 3). For example, *Segmenting* a corporate business into its portfolio of BMs appears to be a non-trivial task. Some authors stay on the level of conceptual types to describe general characteristics and attributes while others compare BMs analytically. IS research can point at an impressive track-record in creating successful formal conceptual representations of one BM (Osterwalder et al. 2005; Gordijn & Akkermans 2001) and "embodies a large body of knowledge with

regard to modeling constructs, concepts, ontology, and artifacts […]" (Osterwalder & Pigneur 2013). One of the first steps of future research could be to extend existing BM conceptualizations (e.g. ontologies) with well-defined constructs that represent relationships between BMs on the level of types, BM instances and elements. The literature identified in this review is already a useful source to identify relevant constructs, such as BM relatedness (Sohl & Vroom 2014), resource redeployment (Sabatier et al. 2010) or integration mechanisms between BM elements (Hoßbach 2015). Because incumbents may run existing BMs, which have built up valuable strategic resources (Sohl & Vroom 2014), we expect that organizations are interested in representing and analyzing their current and new BMs, for example in a shared repository. Future research could be informed by existing research on Enterprise Architecture modeling to understand how such coordinative models help to overcome knowledge barriers and influence enterprise transformation (Abraham et al. 2015).

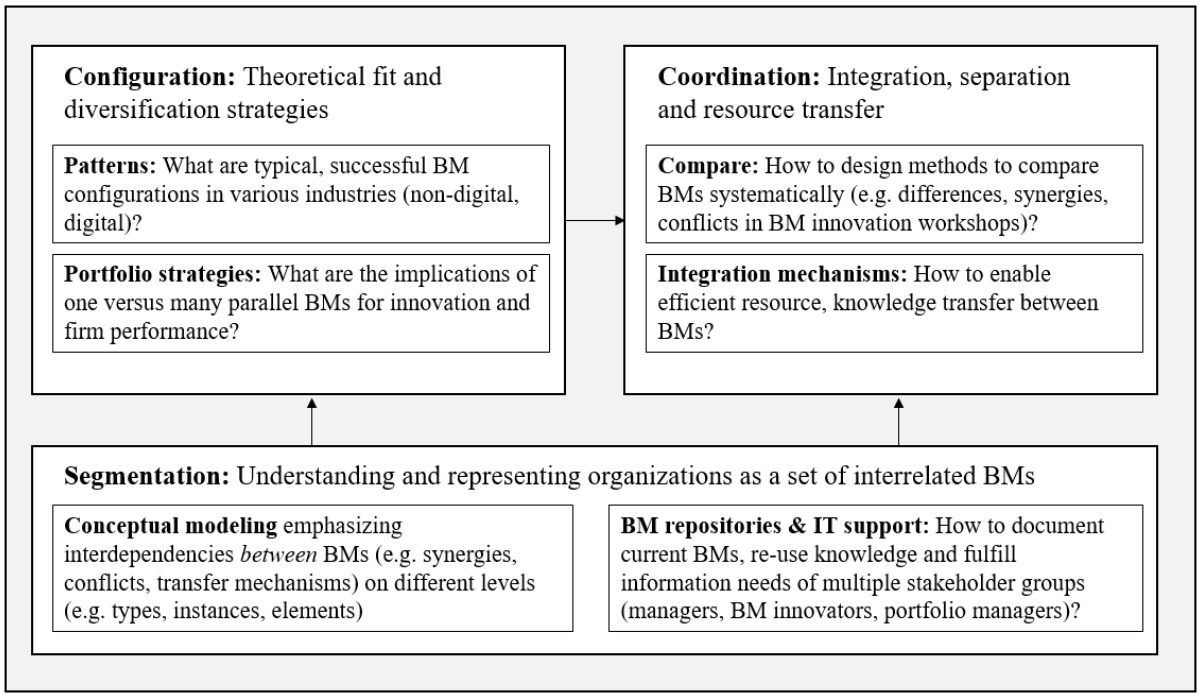

Figure 3. Business model portfolios: characteristics and agenda for Information Systems research

Building on a conceptual model of BM portfolios and well-defined segmentation methodologies, future research could investigate more cases of "high-performing" BM portfolio *configurations*, either in-depth within firms, for different industries or in the context of digitization. BM portfolio patterns could then be used as design patterns during BM innovation (cf. Sprenger & Mettler (2016)) or to inform methods that allow to assess ex-ante whether two BMs will fit or not.

Our research shows also fundamental difference in the conceptualization of BMs in the context of BM portfolios compared to previous literature. Prior research has usually argued that a BM "is crafted by a focal firm's managers in order to best meet the perceived needs of customers" (Zott & Amit 2013), is essentially customer centric. Our results, however, show very little relevance of the customer in BM portfolios. Rather than paying particular attention to the design of one BM in order to meet customer needs in the best possible way, the central value creation mechanisms in a BM portfolio are strategic choices about the right balance of BMs in the portfolio (Sabatier et al. 2010), the ability to leverage synergies by sharing strategic resources across businesses (Sohl & Vroom 2014), and by deciding about integration and separation mechanisms on a BM's component level (Winterhalter et al. 2015). Thus, value creation in BM portfolios complements literature on BM design (Zott & Amit 2013) and traditionally customer centric conceptualizations of BMs with a resource based view (Barney 1991). The BM portfolio and BM experimentation strategy may be as important as finding the "right" BM design.

Future research should assess the value of innovation endeavours that experiment with multiple BMs simultaneously, in order to identify the best possible option(s).

In regards to *coordination,* our findings emphasize leveraging and developing resources and enabling resource transfer between new and old BMs as key (Aspara et al. 2013; Khanagha et al. 2014; Aversa et al. 2015). We argue that by just making choices about how to design (new) BMs to best meet customer needs, managers neglect their own reality in terms of already running BMs, existing capabilities, resources and constraints and that the new BM must be actively embedded into this environment. Future research should therefore examine, in particular, the BM portfolio's role in different phases of BM innovation and extend existing innovation methods (e.g. Frankenberger et al. (2013)). Commercial success of an innovative BM depends significantly on its implementation and coordination with other BMs in the portfolio (Andries et al. 2013; Khanagha et al. 2014; Moingeon & Lehmann-Ortega 2010), is contingent to organizational context factors (Hoßbach 2015; Markides 2013) and should be tested as explanation for "why certain models will function in particular environments and others are not" (Wirtz et al. 2015).

In summary, we show that articles refer to several aspects of BM portfolios. Since segmentation, configuration and coordination depend on each other, we suggest that all three mechanisms are relevant and should constitute a BM portfolio perspective rather than just diversification as in (Sabatier et al. 2010; Sohl & Vroom 2014). We show that literature has begun to cover different aspects in each of these areas. BM portfolios are strengthened as a unit of analysis beyond the innovation context and could provide a significant means to better describe, classify, understand and manage organizations.

7 Limitations

Our review depends to some extend on the selection of keywords and articles. It is possible that we have missed other relevant keywords pointing at additional articles. For example, other conceptualizations of BMs without using the term explicitly were not part of the search process. Another limitation refers to data analysis. Each literature review is a qualitative and also subjective endeavour and other researchers may have found different characteristics of BM-portfolios to be relevant. More importantly, there is still a lack of definitional clarity on when to consider two BMs as distinct - the fundamental requirement of BM portfolios. It could be argued that what is considered as being part of different BMs could also be understood as being part of one single BM. However, given the number of articles by well-known BM scholars who adopt a BM portfolio perspective either explicitly or implicitly assures us that it is, at least, worth investigating the conceptual differences and validate the concept of BM portfolios further in research and practice.

8 Conclusion

By reviewing the emerging literature on multiple BMs from the perspective of three general portfolio management mechanisms (segmentation, configuration and coordination) we provide a systematic and comprehensive characterization of the concept of BM portfolios. We consider BM portfolios as an important complementary perspective to prevalent BM research because it allows a more detailed look into the mechanics of today's organizations, that have to combine already running BMs with novel ones.

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